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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,139	11/14/2003	Stephen M. Cea	42P16000	9935

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EXAMINER

LE, DUNG ANH

ART UNIT PAPER NUMBER

2818

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/714,139

Applicant(s)

CEA ET AL.

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 1-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 19-37 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Oath/Declaration

The oath/declaration filed on 11/14/2003 is acceptable.

Election/Restriction

Application's election without traverse of Group I (Claims 19- 37) drawn to a semiconductor device is acknowledged for prosecution in the subject application . Applicants have the right to file a divisional, continuation or continuation-in-part application covering the subject matter of the non-elected claims 1- 18.

Applicants are reminded to cancelled non-elective claims.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections

Set of claims 19- 30:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 19-26 and 28 are rejected under 35 USC 102 (e) as being anticipated by Currie et al. (2004/0026765 A1).

Currie et al. teach an apparatus 300B (fig. 4) comprising:

a substrate 460;

a strain-inducing layer 430 disposed on the substrate [0077], [0081] or [0083]; and

a strained layer 411 disposed on the strain-inducing layer 430. (also refer to fig. 1)

Regarding claim 20, further comprising:

a gate electrode 860 disposed on the strained layer 811 (fig. 8a-8d);

a first spacer 872 disposed adjacent to a first side of the gate electrode; and
a second spacer 872 disposed adjacent to a second side of the gate electrode
[0103].

Regarding claim 21, wherein the strain-inducing layer and the strained layer are disposed in a channel region beneath the gate electrode (figs 3,4, 7 and 8d).

Regarding claim 22, wherein the strain-inducing layer and the strained layer are disposed in a channel region beneath the gate electrode and the first and second spacers (figs 3,4, 7 and 8d) and [0105].

Regarding claim 23, wherein the apparatus comprises: an n-type metal oxide semiconductor 300B (fig. 4).

Regarding claim 24, wherein the strain-inducing layer 330/430 comprises: silicon germanium.

Regarding claim 25, wherein germanium comprises between approximately 20 and 25 percent of the silicon germanium (Table 1).

Regarding claim 28, wherein the apparatus comprises: a p-type metal oxide semiconductor 300A (fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26- 27 and 29- 30 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Currie et al. in view of the following remark.

Currie et al. disclose the thickness of the silicon germanium, but fail to disclose the silicon germanium layer has a thickness of between approximately 400 and 500 Å as cited in the present claim 26

However, it would have been obvious to one having ordinary skill in the art making semiconductor device to determine the workable or optimal range for the silicon germanium layer has a thickness of between approximately 400 and 500 Å through routine experimentation and optimization to optimal device performance.

Regarding claim 27, wherein the strained layer comprises silicon and has a thickness of between approximately 100 and 200 Å [0056].

Regarding claims 29- 30, Currie et al. discloses the claimed invention except for the strain-inducing layer comprises: silicon carbide as cited in current claim 29 and wherein carbon comprises between approximately 1 and 2 percent of the silicon carbide as cited in current claim 30.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the strain-inducing layer comprises: silicon carbide, because it is commonly used to prevent undesirable reactions in the contact region, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended application.

And, it would have been obvious to one having ordinary skill in the art making semiconductor device to determine the workable or optimal range for wherein carbon comprises between approximately 1 and 2 percent of the silicon carbide through routine experimentation and optimization to optimal device performance.

Set of claims 31- 37:

Claims 31- 35 are rejected under 35 USC 102 (e) as being anticipated by Currie et al. (2004/0026765 A1).

Currie et al. teach a system comprising: an integrated circuit package 300B (fig. 4) comprising:

- a substrate 460;
- a strain-inducing layer 430 disposed on the substrate [0077], [0081] or [0083]; and
- a strained layer 411 disposed on the strain-inducing layer 430. (also refer to fig. 1)

Regarding claim 32, wherein the system comprises: an n-type metal oxide semiconductor 300B (fig. 4).

Regarding claim 33, wherein the strain-inducing layer 430 comprises: silicon germanium.

Regarding claim 34, wherein germanium comprises between approximately 20 and 25 percent of the silicon germanium (table 1).

Regarding claim 35, wherein the system comprises: a p-type metal oxide semiconductor 300A (fig. 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 36- 37 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Currie et al. in view of the following remark.

Regarding claims 36- 37, Currie et al. discloses the claimed invention except for the strain-inducing layer comprises: silicon carbide as cited in current claim 36 and wherein carbon comprises between approximately 1 and 2 percent of the silicon carbide as cited in current claim 37.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the strain-inducing layer comprises: silicon carbide, because it is commonly used to prevent undesirable reactions in the contact region, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended application.

And, it would have been obvious to one having ordinary skill in the art making semiconductor device to determine the workable or optimal range for wherein carbon

comprises between approximately 1 and 2 percent of the silicon carbide through routine experimentation and optimization to optimal device performance.

When responding to the office action, Applicants' are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P. 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG A. LE 
Primary Examiner
Art Unit 2818